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Protective Cassette for Disk-shaped Information Carriers of High Storage Density

Abstract

Known protective cassettes for optically readable disk-shaped information carriers of high storage density have a centrally elevated support in their base portion, on which the information carrier rests in its information-free area. Above this elevated rest in a centered position, a peg arrangement projects, which with its diameter adapted to the diameter of the central hole of the information carrier, engages into the central hole and through a light clamp seating, retains the information carrier on the rest. As such commercially available protective cassettes for digital audio disks show, the clamp seating permissible in such a peg arrangement is not sufficient to retain the information carriers even in the case of strong impact stresses. Therefore it is suggested that the information disk (13) supported on the rest be retained by form-fitting on the peg of the peg

arrangement (71) that engages in to the center hole and in this process to design the peg such that the form-fitting can be eliminated by reducing the peg diameter on exerting an axial pressure on the peg front face, representing a pressure plate (10).

Claims

1. Protective cassette for disk-shaped information carriers of high storage density, especially optically readable digital audio disks (CDs), in which the information carrier is held in the information-free center area on an elevated rest with a central peg arrangement extending above and beyond the upper side of the rest, and herein the peg arrangement, adapted in its peg diameter to the center hole diameter of the information carrier, engages with its peg in the center hole in such a way that the information carrier is retained therein, and in which the peg arrangement has an annular foot which, in the area of its inner ring border, changes over into several spring-acting peg blades distributed uniformly around the circumference, characterized in that these peg blades (91, 92, 93) on the end opposite the annular foot (8) are permanently connected to a pressure plate (10) that forms the peg front face, and that furthermore the peg designed in this way, depending on its elastic deformation in the case of pressure in position on the pressure plate, undergoes a reduction in its diameter, and that the peg blades are provided with retaining or resting cams (11, 11') over which the peg arrangement (71, 72...74) fixes the information carrier (13) placed on the rest (6) in a form-locking way in its center hole area.

2. Protective cassette in accordance with claim 1, characterized in that the peg blades (93) are affixed via connecting cross bars (12') on the pressure plate (10), which in order to facilitate the elastic pressure deformation of the peg, have a wave profile.

3. Protective cassette in accordance with claim 1 or 2, characterized in that the annular foot (8) of the peg arrangement (71, 72 ...74) in the area of its inner ring margin, between the peg blades (92) connected to the pressure plate (10), has additional spring-acting peg blades (92').

4. Protective cassette in accordance with one of the preceding claims, characterized in that the annular foot (8) of the peg arrangement (71, 72 ...74) on the side of its inner annular edge between the peg blades (91, 92, 93) affixed with the pressure plate (10) has spring-acting pressure elements (12, 14) effective in the vertical direction, which are supported against the underside of the information carrier against the information carrier (13) placed on the rest (6) with a spring force that lifts the information carrier when the peg blade form locking is released.

5. Protective cassette in accordance with claim 4, characterized in that the spring-acting pressure elements are spring-acting blades (14) directed radially inward, arranged on the inner annular edge of the circular foot (8) of the peg arrangement (14).

6. Protective cassette in accordance with claim 4, characterized in that the pressure spring-acting elements (12) are foam rubber molded pieces.

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Protective cassette for disk-shaped information carriers of high storage density

Technical Area

The invention pertains to a protective cassette for disk-shaped information carriers of high storage density, especially optically readable digital audio disks (CDs), in which the information carrier in the information-free center area is placed on an elevated rest with a central peg arrangement extending above and beyond the top side of the rest and in this process the peg arrangement adapted in its peg diameter to the center hole diameter of the information carrier fits with its peg into this center hole in such a way that the information carrier is held therein.

Fundamental state of the art

Protective cassettes for CDs are known, for example, from DE 32 05 478 A1. The peg arrangement which engages with its peg through the center hole into the disk to be held when the disk is placed on the elevated rest can be designed in various ways. For example, the desired gentle clamping effect can be achieved with a peg that has a circular cross-section, and the diameter of which is dimensioned for the desired clamping effect. An alternative embodiment provides for a peg that can be elastically deformed perpendicular to its axis of symmetry, which achieves the desired clamping effect through a spring support profile. Such a peg arrangement can also have several elastic segments

in the manner of an axially slotted elastic sleeve, the spring-acting segments of which in the engaging of the peg into the center hole of the disk to be retained, clamp against the edge of the center hole.

All these peg arrangements have in common the fact that the disk is placed on the elevated rest on the base of the protective cassette, the disk is clamped in the peg of the peg arrangement in such a way that it can be easily removed by lifting from the peg. As practice has shown, under consideration of the unavoidable manufacturing tolerances, the clamping effect achievable in this way is not sufficient to secure such cassettes in all cases of the customary handling in such a way that the disk will not be unintentionally loosened from its support. Especially during transport of such storage cassettes, it is sometimes impossible to avoid impact stresses, as a result of which the disk is then lifted off the peg and slips back and forth loosely in the cassette. Aside from the fact that in such cases damage to the disk by scratching cannot be avoided, furthermore such a disk package appears commercially in a light that unfavorably influences advertising and sales.

Disclosure of the invention

The invention is based on the goal, for a protective cassette of the initially described type, of providing an additional solution for holding it in a peg arrangement, which on one hand guarantees reliable retention of the disk in the peg arrangement even under impact load, and on the other hand permits easy handling of the disk upon placement in the protective cassette and during removal from the protective cassettes, similar to the known arrangement.

Beginning from a protective cassette of the initially described type, this goal is accomplished in accordance with the invention by the features specified in the characterizing portion of claim 1.

The invention is based on the recognition that a peg engaging into the center hole of a disk can be easily reduced in diameter by suitable design, depending on an axial pressure stress. In this way it becomes possible to bring about reliable form locking of the peg, engaging into the center hole of the stored information carrier, which upon placement of the information carrier on the elevated rest, is automatically produced by gentle pressure, but can only be abolished if an axial pressure is exerted on the front face of the peg. As long as care is taken to ensure that upon pressing on the front face of the peg, the information carrier is automatically lifted over the peg against the pressure of one or more elastic elements, here also despite the substantially firmer seating of the information carrier in the peg it is possible to place the information carrier over the peg onto the elevated rest with one hand and remove it from this in the same way.

Additional advantageous embodiments of the invention are provided in claims 2 to 6.

Brief description of the drawing

The invention will be described in further detail in the following based on the drawing. The drawing shows the following:

Fig. 1 a known storage cassette for an optically readable information carrier of high storage density with a peg arrangement engaging into the center hole of the information carrier,

Fig. 2 an initial embodiment of a peg arrangement in accordance with the invention,

Fig. 3 the peg arrangement according to Figure 2 in cross-section,

Fig. 4 a second embodiment of a peg arrangement according to the arrangement,

Fig. 5 the peg arrangement according to Figure 4 in cross-section,

Fig. 6 a third embodiment of a peg arrangement according to the invention,

Fig. 7 the peg arrangement according to Figure 6 in cross-section,

Fig. 8 a cut-out of the section drawing according to Figure 7,

Fig. 9 a further cut-out of the section drawing according to Figure 7 with the peg elastically deformed,

Fig. 10 a variant of the peg arrangement according to Figure 6,

Fig. 11 a cut-out of the peg arrangement according to Figure 10 corresponding to Figures 8 and 9.

Optimal execution of the invention

The known storage cassette 1 according to Figure 1 consists of a box-shaped base part 2 and a box-shaped cover part 3, which is connected to the base part 2 on one side over a hinge, not shown in greater detail. In the base part 2, an insert 4 is placed, which has an annular downward-displaced center piece 5 with a centrally elevated rest 6 for

receiving an optically readable disk-shaped information carrier of high storage density. Above the elevated rest 6, which is likewise circular in design, in concentric position a peg arrangement 7 is raised, which has an annular foot 8, which in the area of its inner ring edge changes over into several spring-acting peg blades 9 distributed uniformly around the circumference. The peg, consisting of the peg blades 9, is adapted in its diameter to the center hole diameter of the information carrier to be received in such a way that when the peg of the peg arrangement 7 engages into the center hole of the information carrier, this [latter] in the state in which it is resting on the support 6, is gently clamped in the peg and can also be easily removed from the storage cassette 1 against the force of this clamping seat with one hand.

The strength of the clamping effect is limited in an upward direction by the demand for easy handling of the information carrier to be placed in the storage cassette and to be removed from the storage cassette. The maximum clamping effect achievable with this way has been shown in practice, however, not to permit reliable retaining of the information carrier in the peg of the peg arrangement 7 even in cases in which the protective cassettes are subjected to undesirable impact loads, for example during transport.

Figures 2 and 3 show, in top view and in cross-section, a first solution for a peg arrangement 71 which does not display these deficiencies. The annular foot 8 on its inner annular margin changes into three spring-acting peg blades 91 distributed uniformly around the circumference, which on their end opposite from the annular foot 8 are permanently connected to a pressure plate 10 that forms the front face of the peg. The

spring-acting peg blades 91 hereby have holding cams 11 on the outside at the level of the pressure plate 10, which retain the information carrier placed on the rest 6 in a form locking fashion until this form locking is again released by axial pressure on the pressure plate 10 in the direction indicated by the arrow.

As Figure 2 and Figure 3 also show, in the inner annular space of the circular foot 8, between the spring-acting peg blades 91, pressure-elastic elements are provided in the form of foam rubber cylinders 12, which in the released state project beyond the pressure plate 10 of the peg of the peg arrangement 71 and in the condition of an information carrier placed on the rest 8 [sic], exert spring pressure against the information-free underside of the carrier, wherein this pressure is sufficient to lift the information carrier upward over the peg of the peg arrangement 71 when the form fit is released. In this way it becomes possible also to perform the removal of the information carrier from the protective cassette with only one hand.

In the additional exemplified embodiments of a peg arrangement 72 shown in Figures 4 and 5, the spring-acting peg blades permanently connected to the pressure plate 10 are designated by 92. Here the annular foot 8 of the peg arrangement 72 in the area of its inner annular edge between the peg blades 92 connected to the pressure plate 10 has additional spring-acting peg blades 92'. All peg blades are once again provided with holding cams at the level of the pressure plate on the outside, over which the peg formed in this way, upon engagement in the center hole of an information carrier placed on the elevated rest 6, produces form locking in the area of its center hole edge. Here also once again in the area of the inner annular zone open to the top side of the circular

foot 8, spring-acting pressure elements corresponding to the embodiment in Figures 2 and 3 may be provided.

An especially preferred variant of the embodiment shown in Figures 2 and 3 is illustrated by Figures 6 and 7 in top view and cross section. The peg arrangement here denoted by 73 differs from the embodiment shown in Figures 2 and 3 in the fact that to improve the elastic pressure deformation of the peg thus shaped, the spring-acting peg blades 93 with the pressure plate 10 are affixed via connected cross bars 12 on the pressure plate 10, which display a wave profile over their length. As opposed to Figures 2-5, here instead of holding cams, catching cams 11' are provided with which the peg blades, when the peg engages the center hole of the information carrier 13 shown in Figure 7, reach with their catching cam over the center hole edge face on the top side of the information carrier 13 and hold it in this way on the rest 6 securely against strong impact stresses.

For better understanding of the mode of action of the peg arrangement in accordance with the invention in Figures 8 and 9, an enlarged view of the cut-out corresponding to the circular cut-out KA shown in Figure 7 is shown, of which the cut-out in Figure 8 shows the information carrier 13 fixed on the rest 6 in the peg of the peg arrangement 73. Figure 9 shows how under an axial pressure on the pressure plate 10 in the direction of the arrow the diameter of the peg diminishes and in this way the catching cams 11' of the spring-acting peg blades 93 release the information carrier 13 so that it may be removed from the rest 6.

The peg arrangement 74 shown in top view and in a cut-out in Figures 10 and 11, which represents a variant of the peg arrangement 73 according to Figures 6 through 9, differs from the peg arrangement 73 only in that automatic lifting of the information carrier 13 up over the peg upon release of the form locking is made possible here by spring-acting blades which are arranged on the inner annular edge of the circular foot 8 and aligned radially inward. On their free end at the top they have nipple-like projections 14', with which they are supported against the underside of the information carrier.

6 claims

11 figures

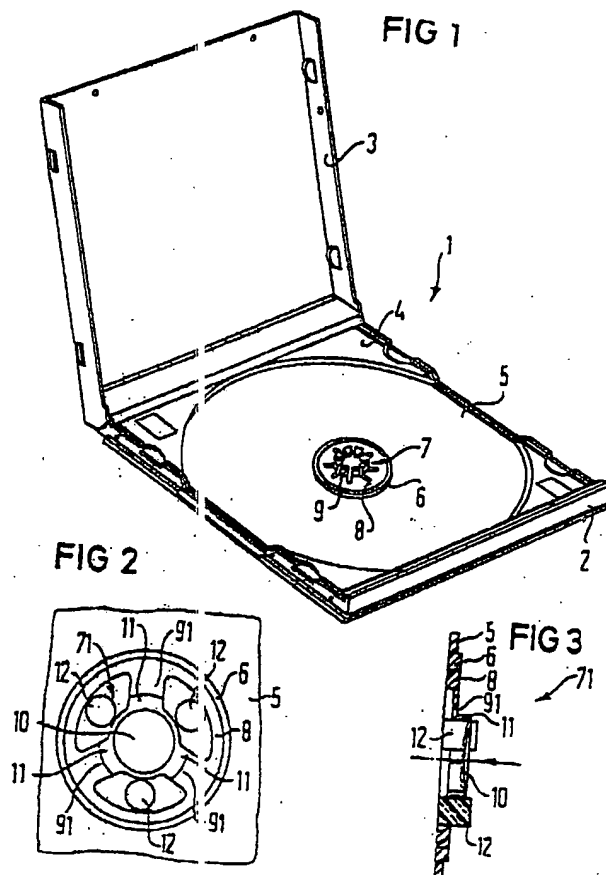


FIG 4

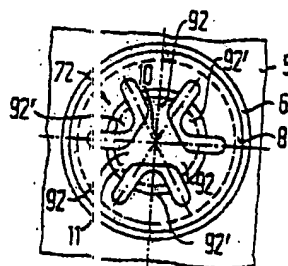


FIG 5

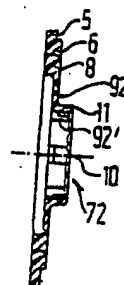


FIG 6

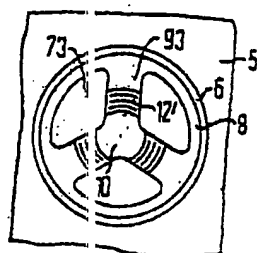


FIG 7

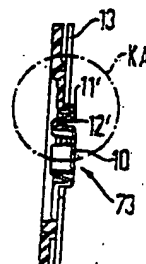


FIG 8

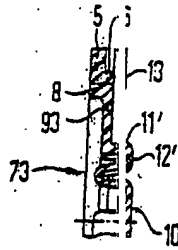


FIG 9

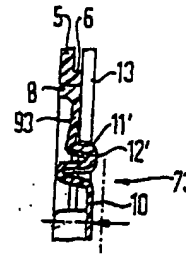


FIG 10

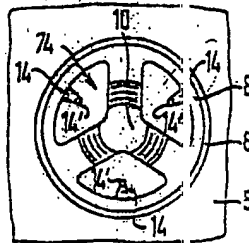


FIG 11

